



**CALIFORNIA
ENERGY COMMISSION**



**CALIFORNIA
NATURAL
RESOURCES
AGENCY**

California Energy Commission
Clean Transportation Program

FINAL PROJECT REPORT

Electric Vehicle Charging at Federal Parking Facilities and Buildings

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PREFACE

Assembly Bill 118 (Núñez, Chapter 750, Statutes of 2007) created the Clean Transportation Program. The statute authorizes the California Energy Commission (CEC) to develop and deploy alternative and renewable fuels and advanced transportation technologies to help attain the state's climate change policies. Assembly Bill 8 (Perea, Chapter 401, Statutes of 2013) reauthorizes the Clean Transportation Program through January 1, 2024, and specifies that the CEC allocate up to \$20 million per year (or up to 20 percent of each fiscal year's funds) in funding for hydrogen station development until at least 100 stations are operational.

The Clean Transportation Program has an annual budget of about \$100 million and provides financial support for projects that:

- Reduce California's use and dependence on petroleum transportation fuels and increase the use of alternative and renewable fuels and advanced vehicle technologies.
- Produce sustainable alternative and renewable low-carbon fuels in California.
- Expand alternative fueling infrastructure and fueling stations.
- Improve the efficiency, performance and market viability of alternative light-, medium-, and heavy-duty vehicle technologies.
- Retrofit medium- and heavy-duty on-road and nonroad vehicle fleets to alternative technologies or fuel use.
- Expand the alternative fueling infrastructure available to existing fleets, public transit, and transportation corridors.
- Establish workforce-training programs and conduct public outreach on the benefits of alternative transportation fuels and vehicle technologies.

To be eligible for funding under the Clean Transportation Program, a project must be consistent with the CEC's annual Clean Transportation Program Investment Plan Update. The CEC issued Contract 600-14-004 to identify and prioritize federal parking facilities and buildings for the installation of plug-in electric vehicle charging infrastructure and conduct the installation of the charging infrastructure. This contract was executed as 600-14-004 on June 3, 2015.

ABSTRACT

The United States General Services Administration has identified a lack of adequate electric vehicle charging stations at federal parking facilities and buildings. This project surveyed federal parking facilities and buildings to determine the potential for installing electric vehicle charging stations at those facilities. The project ultimately installed 50 level 2 charging connectors across 9 federal facilities statewide.

Keywords: Electric vehicles (EV), Electric Vehicle Supply Equipment (EVSE)—Infrastructure designed to supply power to EVs. EVSE can charge a wide variety of EVs, including BEVs and PHEVs, The United States General Services Administration (GSA), Blanket Purchase Agreement (BPA).

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EXECUTIVE SUMMARY

The United States General Services Administration has identified a lack of adequate electric vehicle charging stations at federal parking facilities and buildings. For this project, the administration surveyed its parking facilities and buildings to determine the potential for installing electric vehicle charging stations.

The administration gathered site and electrical plans for federal facilities to prioritize which facilities would be best suited for electric vehicle charging stations. The administration considered the location's demand for electric charging, the cost effectiveness, and parking spaces available as some of the criterion when prioritizing sites.

Once sites were prioritized, the administration developed a design-bid-build solicitation package to contract out for the site installations.

The administration researched potential electric vehicle charging manufacturers to select the equipment for the project. The administration reviewed charging equipment from ChargePoint, Clipper Creek and Liberty Plug-ins, and SemaConnect. The project ultimately used ChargePoint's CT4000 dual port level 2 charging equipment.

The administration also evaluated cost and administrative comparisons between managing data in-house through metering versus contracting out data management and maintenance services via a third party.

During the project, a new internal policy had to be created for charging personally owned vehicles at government facilities. A project team was assembled in late 2015 to tackle this issue.

Nine existing federal facilities statewide were chosen for the project resulting in the installation of 50 Level 2 charging connectors.

CHAPTER 1:

Project Background and Approach

Introduction

In March 2015, Executive Order 13693, "Planning for Federal Sustainability in the Next Decade,"¹ was signed, introducing new requirements and expands upon requirements previously established by Executive Order 13514² in October 2009.

The order references specific activities including regional development of fueling infrastructure for alternative fuel vehicles including EV's. By deploying charging opportunities at Federal facilities and converting vehicles from fossil fuels to alternative energy sources is one of many ways the GSA is helping other federal agencies to reduce greenhouse gas emissions in the federal fleet.

Under this order, GSA shall also ensure that charging stations are available through GSA with vehicle level data reporting capabilities.

GSA has also identified a lack of adequate EVSE at Federal parking facilities and buildings. New EVSE have the potential to provide greater usability for the current fleet of EVs owned by the federal government and will also serve as a tool to encourage more agencies to purchase electric and hybrid vehicles.

The purpose of this project was to identify and prioritize federal parking facilities and buildings for the installation of plug-in EV charging infrastructure and conduct the installation of the charging infrastructure

Site Selection and Prioritization

GSA gathered site and electrical plans for federal facilities and discussed the program with agency contacts to determine the location's interest and feasibility of installing EV chargers at a site. Items considered included the sites potential charging demand, electrical capacity, and preliminary placement of the chargers.

Once GSA gathered the information, the sites were prioritized based on:

- Demand for EV charging
 - Current EV fleet size and make-up
 - Future agency EV usage (near- and long-term vehicle replacements)
- Locations in areas with high concentration of EV fleet
- Existing infrastructure conditions that support EV charging
- Parking spaces available to dedicate to EV charging
- Cost effectiveness
- Ability to for rapid deployment

¹ [Executive Order 13693](https://www.epa.gov/greeningepa/executive-order-13693-planning-federal-sustainability-next-decade) <https://www.epa.gov/greeningepa/executive-order-13693-planning-federal-sustainability-next-decade>

² [Executive Order 13514 Document](https://www.energy.gov/sites/prod/files/nepapub/nepa_documents/RedDont/Req-EO13514envtllleader.pdf)
https://www.energy.gov/sites/prod/files/nepapub/nepa_documents/RedDont/Req-EO13514envtllleader.pdf

Site Development and Design

Once sites are selected, GSA determines the electrical infrastructure capacity of the selected sites using instrumentation and data loggers on the most likely electrical panels to be used. This data was used to verify capacity at the building or the parking lot's specific panels. Electric engineers would visit sites as necessary to verify the site conditions and coordinate with the building management.

The contractor developed design documents for the selected sites. Some of the more complex installations required electrical engineering plans.

During the project, GSA considered three different deployment options:

- Dedicated parking spaces and charging stations
- First-come, first-served charging stations
- Encourage dedicated spaces.

GSA developed scope of works for each of the project locations and awarded contracts for the installation of the chargers.

Project Locations

The project installed 50 Level 2 connectors at 9 existing federal facilities listed. Table 1 below lists the project locations, address, and number of Level 2 connectors installed at each location.

Table 1: List of Project Locations

Location Name	Location Address	# of Level 2 Connectors
Ronald V Dellums Federal Building and US Courthouse	1301 Clay Street Oakland, California	4
McKelvey Federal Building (Building 15)	345 Middlefield Road Menlo Park, California	8
Sacramento Federal Building	2800 Cottage Way Sacramento, California	20
Philip Burton Federal Building and US Courthouse	450 Golden Gate San Francisco, California	4
Robert F. Peckham Federal Building	280 South 1 st Street, San Jose, California	4
Seal Beach	800 Seal Beach Blvd Seal Beach, California	4
North Los Angeles Federal Building	300 N Los Angeles St Los Angeles, California	2
Edward J Schwartz Federal Office Building	800 Front St San Diego, California	2
Los Angeles Courthouse	350 West 1 st Street Los Angeles, California	2
TOTAL		50

Source: GSA

Project Equipment

GSA researched potential manufacturers for the charging equipment and evaluated cost and administrative comparisons between managing data in-house through metering versus contracting out data management and maintenance services via an external contractor.

GSA reviewed charging equipment from ChargePoint³, Clipper Creek and Liberty Plug-ins, and SemaConnect⁴. The project utilized ChargePoint CT4000 dual port level two charging equipment.

Blanket Purchase Agreement

Federal agencies may choose to procure their charging equipment through the GSA schedule. In 2017, GSA Fleet awarded a Blanket Purchase Agreement (BPA) for EV chargers that eliminates redundant contract actions and achieves volume discount pricing. The BPA is available for all GSA Fleet leasing and purchasing customers to utilize for their charging station and data needs. The BPA had a variety of charger configurations including level 1, level 2 and direct current fast charging options.

³ [ChargePoint Website](https://www.chargepoint.com/) <https://www.chargepoint.com/>

⁴ [SemaConnect Website](https://semaconnect.com/) <https://semaconnect.com/>

CHAPTER 2:

Project Results

Lessons Learned

During the project, a new internal policy had to be created for charging privately owned vehicles at government facilities. A project team was assembled in late 2015 to tackle this issue. In October 2016, GSA released the Electric Vehicle Supply Equipment Infrastructure Management (5605.1 PBS)⁵ that provides guidance on the use of and financial accountability for EV charging infrastructure at facilities owned or leased by GSA.

Executive Order 13693⁶ requires federal agencies to plan for appropriate charging or refueling infrastructure for zero emission or plug-in hybrid vehicles, and to seek opportunities for ancillary services to support vehicle-to-grid technology. Implementing Instructions published along with this executive order required agencies to procure charging stations, where possible, infrastructure that will allow for vehicle level data reporting capabilities. GSA is committed to meeting these goals and helping agencies that occupy space in GSA owned/leased facilities to do so as well.

The Fixing America's Surface Transportation (FAST) Act of 2015⁷ authorizes Federal agencies to use appropriated funds to install and operate EV charging infrastructure for privately owned vehicles, provided these vehicles are authorized to park in a federally controlled parking area. The FAST Act also requires federal agencies to collect fees for the use of these EV charger to recover infrastructure, maintenance, and operating costs.

Data Collection and Analysis

GSA Central Office (Fleet Management) executed a BPA for government-wide use for EVSE. The BPA included equipment and data management services, but not installation. Chargepoint stations were selected and procured using the BPA, following the BPA's procedures.

GSA Region 9 had no experience with the design and installation of EVSE; this is a new area. The relatively small dollar value of the procurement precluded hiring an architectural/engineering firm with the requisite experience to do a full design. The alternative was to hire a Chargepoint certified installer with sufficient experience to scope out and design the installations.

GSA consulted with Chargepoint on sources capable of providing the necessary site survey and installation service. Chargepoint provided its list of "Operation & Maintenance Partners"⁸ who could perform the work. Unfortunately, the list of available partners had to be pared down further due to contractual limitations (e.g. lack of System for Award Management registration) or unavailability of support staff.

The chosen contractor met all contractual requirements; however, they had a difficult time meeting the construction schedule due to the security requirements at each federal facility.

⁵ [Electric Vehicle Supply Equipment Infrastructure Management](https://www.gsa.gov/directives-library/electric-vehicle-supply-equipment-infrastructure-management-56051-pbs) <https://www.gsa.gov/directives-library/electric-vehicle-supply-equipment-infrastructure-management-56051-pbs>

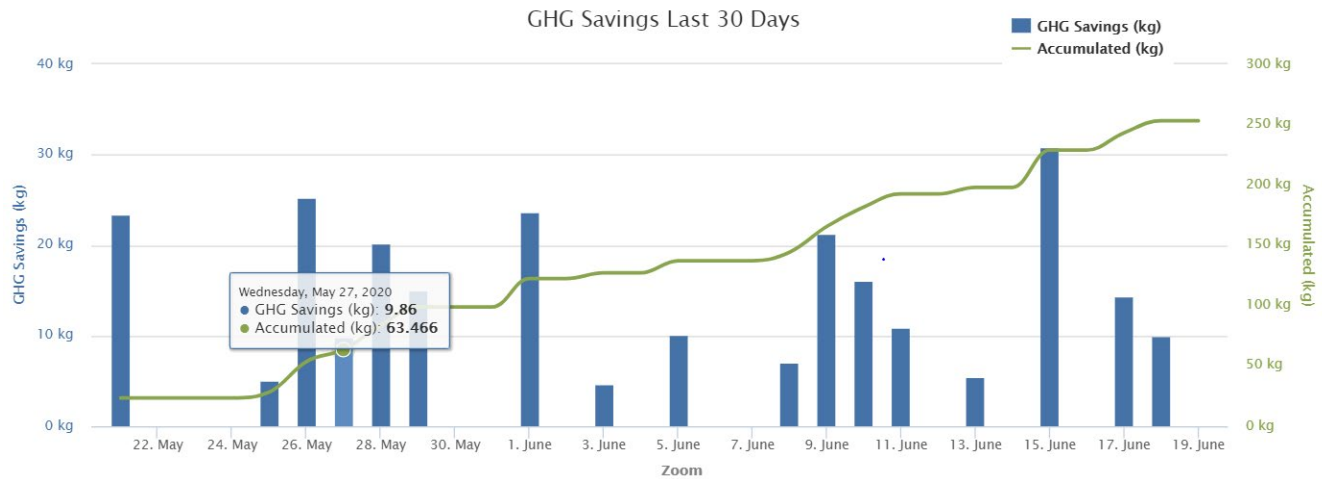
⁶ [Executive Order 13693 Document](https://www.gsa.gov/cdnstatic/KK_EO_13693_to_GBAC_4-23-15_Mtg.pdf) https://www.gsa.gov/cdnstatic/KK_EO_13693_to_GBAC_4-23-15_Mtg.pdf

⁷ [America's Surface Transportation \(FAST\) Act of 2015](https://www.transportation.gov/fastact) <https://www.transportation.gov/fastact>

⁸ [ChargePoint's list of Operation & Maintenance Partners](https://www.chargepoint.com/products/service/) <https://www.chargepoint.com/products/service/>

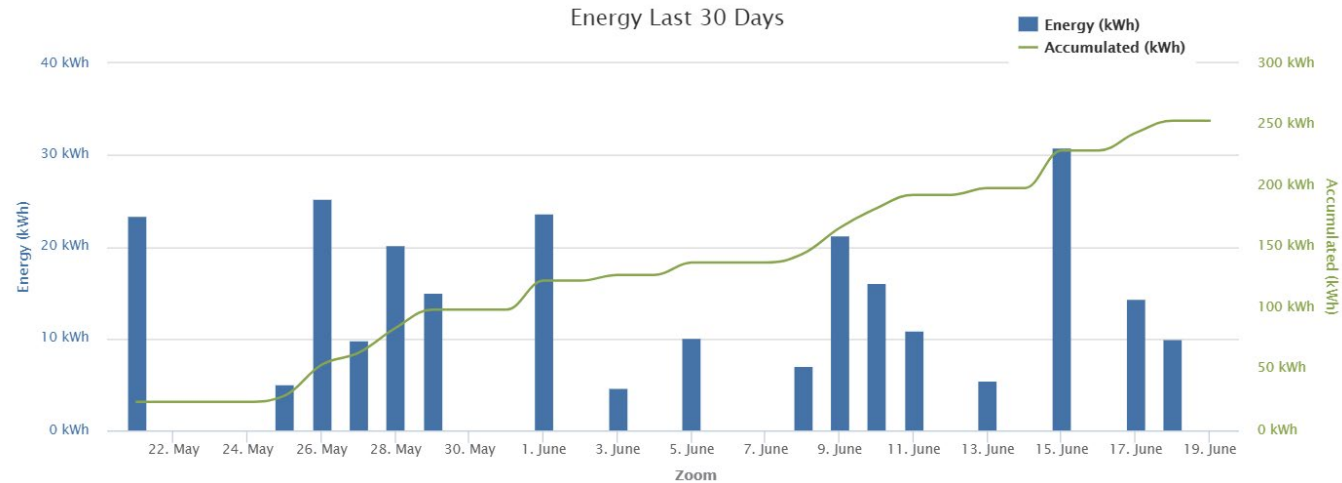
GSA was frequently forced to report a delay in schedule due to time extensions required for signal boosters, additional cabling, etc. for the Chargepoint units to function properly. The contractor had a difficult time adjusting from their 'normal' commercial installations. The design drawings were not 100 percent accurate and the GSA relied too heavily upon the expertise of the contractor. The project team was able to overcome the scheduling delays and finished the installation of the charging units within the project deadline. Figures 1-3 indicate the statistics gathered over a 30-day operating period.

Figure 1: Greenhouse Gas Savings



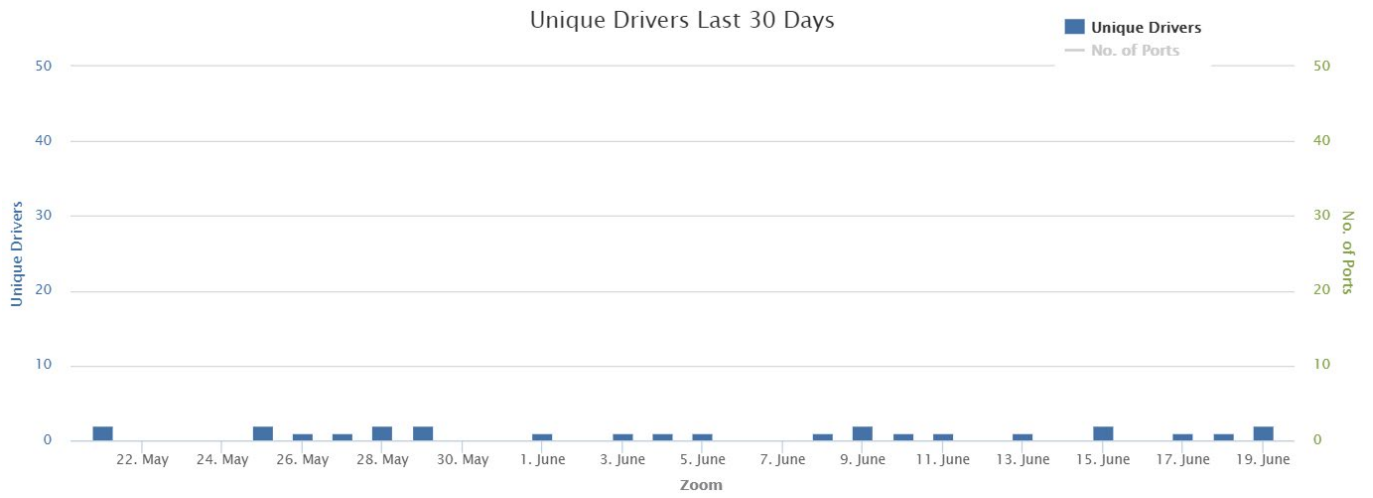
Source: GSA

Figure 2: Energy Delivered



Source: GSA

Figure 3: Unique Drivers



Source: GSA

GLOSSARY

BLANKET PURCHASE AGREEMENT (BPA)—is an agreement established by a government buyer with a Schedule contractor to fill repetitive needs for supplies or services ([FAR 8.405-3](#)). BPAs make it easier for the contractor and buyer to fill recurring needs with the customer's specific requirements in mind, while using the buyer's full buying power by taking advantage of quantity discounts, saving administrative time, and reducing paperwork.⁹

CALIFORNIA ENERGY COMMISSION (CEC)—The state agency established by the Warren-Alquist State Energy Resources Conservation and Development Act in 1974 (Public Resources Code, Sections 25000 et seq.) responsible for energy policy. The Energy Commission's five major areas of responsibilities are:

1. Forecasting future statewide energy needs
2. Licensing power plants sufficient to meet those needs
3. Promoting energy conservation and efficiency measures
4. Developing renewable and alternative energy resources, including providing assistance to develop clean transportation fuels
5. Planning for and directing state response to energy emergencies.

ELECTRIC VEHICLE (EV)—A broad category that includes all vehicles that are fully powered by electricity or an electric motor.

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE)—Infrastructure designed to supply power to EVs. EVSE can charge a wide variety of EVs, including BEVs and PHEVs.

THE UNITED STATES GENERAL SERVICES ADMINISTRATION (GSA)— The General Services Administration manages federal property and provides contracting options for government agencies.¹⁰

⁹ [Blanket Purchase Agreement](https://www.gsa.gov/buying-selling/purchasing-programs/gsa-schedules/schedule-features/blanket-purchase-agreements) <https://www.gsa.gov/buying-selling/purchasing-programs/gsa-schedules/schedule-features/blanket-purchase-agreements>

¹⁰ [The United States General Services Administration](https://www.usa.gov/federal-agencies/general-services-administration) <https://www.usa.gov/federal-agencies/general-services-administration>